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Recensioni

Ronald J. Planer, Kim Sterelny
From signal to symbol. The evolution of language
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In little more than the first two decades of the present century, we have seen a proliferation of accounts purporting to explain the origins and evolution of human language.

Many researchers have proposed that a specific condition or behavioral factor catalyzed the development of language: some researchers have pointed to grooming, to gossip, to our hominin ancestors' need to coordinate actions when hunting, to the need to facilitate transmission of technological innovations, to increased capacity for imitation, to processing a gestural code, to singing, to persuasive practices, and many other elements. By contrast, Ronald Planer and Kim Sterelny do not single out any privileged driver in language evolution.

There is another major divide among the many hypotheses put forward to help one get grips with this topic: on the one side, theoreticians who defend a thorough gradualist model of language evolution and, on the other, those, mostly Chomskyans, who think that language appeared quite suddenly. Planer and Sterelny figure in the first camp, like many others and share some of their basic views, again differing from Chomskyans: language, meant as a complex and complete phenomenon, has a primary role in interpersonal communication and has emerged alongside the slow and cumulative growth of cognitive elements, which have progressively overlapped. Several selection pressures led to language as a particularly articulated form of adaptation to the environment. An explanatory strategy based on these assumptions might seem excessively adaptationist and simplistic; therefore, to appear plausible, it has to be characterized in a very coherent and detailed way.

Planer and Sterelny strive, in their book, to provide a coherent and extraordinarily detailed explanation, which aims at reconstructing how language appeared and evolved, without appealing to any miraculous event. They consider language to have progressed through a series of stages across the lives of the ancestors of today's *Homo sapiens*. This evolution resulted from the alternation of several protolanguages, which became progressively richer and more complex: moving from essential indexical elements to real symbols; indeed, as the title specifies, from signals to symbols. Hominins, who lived at the end of the Pliocene, were the protagonists of this early transition. They were endowed with cognitive tools not that different from the ones available to today's great apes, but had already started to habitually assume an erect posture.

Planer and Sterelny focus on the Pleistocene because they think that those hominins, faced with unusually unstable environmental conditions, had to cooperate more intensively. Thus, their brain, especially the cortex, increased in volume. According to the two authors, after the first third of the Pleistocene, our hominin ancestors were already able to rely on protolanguages consisting of structured signs. They could use those signs to refer to objects and situations which were not present (displaced reference), and they could enlarge their repertoire by adding new semantic units. It is likely that the switch to more complex structures of signs was based on gestures. The signs that contributed to more complex structure were derived by composition of elementary signs. Although order did not necessarily determine their meaning, it may have been somehow relevant.

The next step was the evolution of real syntax, which characterizes hierarchical sentence structure. According to Planer and Sterelny, this development allowed these hominins to instantiate structured hierarchies required by more complex thought processes in language. It was largely pushed by the need to better coordinate new technical processes employed in obtaining stone tools. In the Pleistocene, stone tools became more and more sophisticated, especially with the beginning of the *Acheulean* culture, 1,7 million years ago. It is likely that such hierarchical structures were consolidated in the cognitive apparatus of populations of *Homo heidelbergensis* between 500.000 and 250.000 years ago, thanks to their practice of constructing instruments composed of parts. To build such items the *heidelbergenses* needed to rely on cognitive resources, which allowed them to plan the various different, coordinated and sequential phases of their work.

In other words, the hierarchic structure of thought allowed them to coordinate manual skills, organizing the well-defined movements needed to make objects (specific arm movements for tools of different kinds). This was later used as an organic proto-model to refine coordination of gestures and signs. Therefore, it seems reasonable to conceive of communication as starting with a gestural format which later switched to a mainly vocal format.

The two authors argue that this transition from versions of increasingly articulated gestural proto-languages to largely vocal language was due to the advent of a new era marked by new environmental and social dimensions: the domestication of fire. The fires, around which our remote ancestors gathered, created a fairly reassuring context: they kept away predators, were used to cook food (which was

therefore more digestible and incurred less risk of infection) and provided warmth. Moreover, fires increased the time of visibility: thanks to firelight, our troglodyte ancestors could spend more time together and had more time to exchange information with gestures, which were more easily recognizable.

In the *firelight niche*, proto-humans could sing primitive melodies, likely without words; and they could laugh together: two activities that improved vocal control. As time went on vocalizations were added to help them better understand gestures in the twilight. First vocalizations were combined with emotional expressions, then they strengthened the semantic value of signs and symbols, until, in the end, they almost completely replaced gestures.

The last 150,000 years or so of the Pleistocene reveal another great turn in human evolutions. The cooperative aspects of life multiplied, leading to the amplification of the social dimension. *Sapiens* populations became better at managing their modified environment (also using fire) to optimize exploitation of spoils from hunting, which was now their main activity, and to improve cooperation in harvesting plant-based foods. More developed forms of cooperation required customary practices, norms, and conventions; these could not be maintained without relying on some kind of language, however primitive. It was probably at this point that proto-languages (at an advanced level) transformed into a real language, although rudimentary.

Therefore, thanks to a global form of evolution, that touched every aspect of the human ecosystem and can already be considered a form of cultural evolution, language appeared. It was an instrument to communicate important information and to more proficiently organize the social dimension. It is possible that earlier hominins, even 500,000 or more years ago were predisposed for the use of language. However, only the coevolution of different factors (cognitive as well as social and environmental) could lead to the build up of the right circumstances.

This is the solution Planer and Sterelny offer to the puzzle of the appearance and evolution of human language. As they claim, they embrace an explicitly adaptationist and incremental perspective, which recognizes language as an overall cognitive tool, a tool mainly dedicated to communication. However, the approach of the two authors is a refined, not a naïve, kind of adaptationism. For each conjecture that they propose, and they propose many, they pick suitable evidence to justify their theses and argumentations. And they rely on an impressive amount of empirical data, which makes their investigation similar to a form of cognitive archeology.

Adopting this methodology, Planer and Sterelny identify the subject matter of their research, namely language, as a *mosaic* (cf., p. 37). This mosaicist approach is in line with a fairly popular trend among paleoanthropologists and philosophers of biology, although the notion of "mosaic" can have different meanings. When referring to language, "mosaic" indicates that there is not a specific and single evolutionary trait at play but rather a composite set of elements and/or different traits, which may have followed different evolutionary paths.

Thus, for Planer and Sterelny the mosaic of language consists of diverse components, such as efficient short-term memory, the computational capacity to immediately analyze and engender sentences, the ability to monitor these preceding competencies, semantic memory, the use of mental models, the capacity for mindreading and social learning, a high-level of social tolerance and the disposition to cooperate.

These different cognitive tools were likely present in early hominins; when they repeatedly used them in a synchronized way, they developed the sophisticated traits associated with more recent evolution, e.g. syntax. Thus, in the mosaicist perspective of Planer and Sterelny, there is no single determinant for the appearance and the evolution of language. There is no necessary condition that made language appear, as if by miracle. All of the elements, which contributed to the implementation of language, all of the tiles in the language mosaic, were necessary; grammatical competence included. But they do not consider even grammatical competence to be special.

Grammatical competence is likely necessary; yet it is necessary, not sufficient, like all of the other components. Language is a complex, cognitive apparatus, made up of diverse ingredients, all of which are constitutive, and each of which has had a unique evolutionary history. All of these elements were combined by a common evolutionary trend, and they were assembled because of a selective force consisting in the need to improve and optimize communication: this force was the glue that allowed for the genesis of language as we know it. So, each ingredient is constitutive, and each may have developed at different times, in a gradual mode, without the intervention of any specific determinant event.

The book by Planer and Sterelny has many merits, chief among them, its clarity and the extensive information it provides, supported by scientific evidence. Indeed, this may lead to grumbling among those who take a skeptical stance regarding the reliability of archeological and paleoanthropological evidence.

However, the two authors «do not claim to have provided even a close approximation of a proper lineage explanation, [but rather] an independently supported baseline identifying the communicative skills of the earliest hominins to language-equipped modern humans» (p. 222). Yet they claim «to have outlined [...] important elements of such an

explanation» (*ibidem*). The scientific and philosophical grumblers will judge the book by Planer and Sterelny as another *just so story*; if so, it is a useful and extraordinarily well written *just so story*.

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